Fujitsu Radio Units

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Application

RIC/SMO
Optimization by AI + Digital Annealer

Virtualized CU/DU
Resource Control

Radio Unit
Sleep Control

UE
Less Users

User mobility
Suburban Residence
Commute
Urban office

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Predict user mobility and application usage, and reduce redundant resources.

Run on shared cloud resources with minimum power consumption.

Keep QoE and reduce power consumption with optimal radio resource allocation for the number of users to be served. May halt radio at night for zero power.

CO₂ emission of total system to be 1/2 of today's amount by FY 2025 *

* Compared with conventional RAN system
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RU Power Consumption Reduction technologies with RIC/SMO

Achieve “No data, no power” (0 bit, 0 watt) and “Zero power standby” by interworking with RIC/SMO

High-gain antenna technology, and high efficiency amplifier technology

Level of Service Load (Amount of Data Passing RU (bits))

No Load
Light Load
Medium Load
Heavy Load

Optimization and Sleep Control

Areas with fewer users
Areas with a high number of users

direction of user movement during the day
Key differentiators

High efficiency power amplifier and in-house device technology that achieves power saving

1. **High Efficiency Power Amplifier**
   - Efficiency
   - DPD technology achieves high efficiency power amplifier with low ACLR
   - Reduce power consumption of RU along with high gain antenna technology

2. **In-house device development**
   - Device
   - World first RFIC supporting multi-beam multiplexing for mmWave
   - High-capacity with low power consumption and small size

3. **Sleep control of RU**
   - Control
   - Now power consumption during sleep mode
   - Reduce power consumption by “0-bit, 0-watt” technology

4. **Device technology toward 6G**
   - Future
   - In-house development of GaN-HEMT, InP-HEMT device for 6G
   - High output power in Sub-THz (100-300GHz) frequency range

This material includes information from a project commissioned by the New Energy and Industrial Technology Development Organization (NEDO).
Measures for RU lower power consumption

● Effect by improving efficiency of RU unit

<table>
<thead>
<tr>
<th></th>
<th>Antenna gain improvement</th>
<th>PA efficiency improvement</th>
<th>Energy saving effect on RU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna improvement</td>
<td>1.8dB</td>
<td>—</td>
<td>-27.1%</td>
</tr>
<tr>
<td>PA improvement</td>
<td>—</td>
<td>10%</td>
<td>-16.0%</td>
</tr>
<tr>
<td>Both improvement</td>
<td>1.8dB</td>
<td>10%</td>
<td>-37.7%</td>
</tr>
</tbody>
</table>

Assumption:
- PA consumes 80% of total energy of RU
- PA efficiency of 40% before improvement

● Measures for “0 bit, 0 watt”
  ● Aim to reduce standby power consumption at 0 bit to 20% of the maximum operation.
  ● Aim to achieve NO power consumption during sleep mode.

Analog power consumption reduced by 27.1%
Analog power consumption reduced by 37.7%
Apply 0bit 0watt technologies

Reduce power consumption during sleep to 0%
Reduce standby power consumption at 0 bit to 20%
85%
55%
70% load
0bit
Maximum bit
RU power consumption

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Reduce environmental impact throughout the product life cycle

Percentage of CO2 emissions through the product life cycle *

Material: Less than 10%-
Manufacturing, Logistics: Less than 5%
Power consumption in operation: More than 80%
Disposal: Less than 5%

Operation process
Technologies to reduce power consumption (product-relevant only)

Radio Unit
- Higher efficiency
- Higher sensitivity
Power consumption to be reduced to 1/2 in FY2025

Optical Transport
- Photonics-Electronics Convergence technology
- Larger capacity and higher performance
Power consumption to be reduced to 1/2 in FY2025

Disposal process

Waste reduction *
- Easy-to-recycle design
- Easy-to-dismantle design
- Raw material labeling
- Reuse of parts

Reduction of material*
- Smaller and lighter
- Reduce the parts
- Recycled materials
- Less packing materials

Materials/Manufacturing/Logistics processes

Use of recycled materials

*Fujitsu Product LCA Initiatives
https://www.fujitsu.com/jp/about/environment/lca/index.html

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Thank you